



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/586,548

07/19/2006

Shunji Kikuhara

TAN-126

6462

54630 7590 06/10/2009

ROBERTS & ROBERTS, LLP
ATTORNEYS AT LAW
P.O. BOX 484
PRINCETON, NJ 08542-0484

EXAMINER

LIAO, DIANA J

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/10/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,548	Applicant(s) KIKUHARA ET AL.	
	Examiner DIANA J. LIAO	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 3, 4, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 3, 4, 19 and 20 recite that the carrier further comprises other oxides, such as lanthanum and yttrium. However, the carrier referred to in claim 1 recites that catalyst comprises a carrier *consisting of* ceria and praseodymium oxide, thus excluding the presence of other oxides. Further amendment or clarification is necessary.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silver (US 6,455,182) in view of Logan, et al. ("Oxygen availability in mixed cerium/praseodymium..." 1994) and Marecot, et al. (US 5,413,984).

Silver '182 teaches a catalyst composition for a shift converter containing a ceria-zirconia composite and a supported noble metal. Shift converters are used to reduce the CO content in process gases. (col 1, lines 35-41) This is otherwise known as the water gas shift reaction. (col 2, lines 26-30) The composition includes at least ceria and zirconia. (col 2, lines 57-61) A third metal oxide may also be added, such as praseodymium, lanthanum, neodymium or hafnium oxide to for a ternary mix. (col 3, lines 1-3) In terms of mole %, ceria is preferably present from 50-70%, zirconia from 50-30% and the third metal oxide is 0-10%. Noble metal is to be supported in an amount of 0.1-2.0%. The amount of zirconia is adjusted to stabilize the catalyst without running the risk of being present in excess and creating separate zirconia and ceria phases. (col 4, lines 41-52) The zirconia increases the oxygen vacancies and activity of the composition as well as the durability of the ceria. (col 2, linse 61-65) The catalytic noble metals are chosen from a group including platinum, ruthenium, iridium, and silver. Metals may be used in combination. (col 6, lines 20-31) Alumina may be added to especially if the composition is to be used as a coating. (col 3, lines 3-5)

Regarding washcoating onto a metal base, Silver '182 does not mention the type of base used. However, Silver '182 does teach the use of the composition as a

Art Unit: 1793

washcoat, preferably with the use of alumina in that case. The type of substrate the washcoat is applied to is not discussed. However, metal substrates are well known in the art and it would have been obvious to one of ordinary skill to choose an appropriate substrate. Metallic substrates are known for reaching high temperatures quickly and having low deterioration rates at high temperatures, for example. Therefore, applying a washcoat to a metallic base is not found patentable over the prior art.

Logan, et al. shall be introduced to discuss the identity of the carrier material.

Marecot '984 shall be introduced to discuss the supported noble metals.

Regarding the metal oxides in the carrier, Silver '182 teaches examples within the ceria range, and also to include an additional oxide such as praseodymium or lanthanum oxide. Silver '182 also teaches that the third oxide be present in an amount of up to 10%, which significantly overlaps with the claimed range of 0.1-15 wt.%. Thus, the inclusion of lanthanum or yttria oxide in that amount is found to be obvious.

However, Silver '182 teaches the use of zirconia, which is excluded by the instant claims.

Logan, et al. discusses mixed cerium/praseodymium oxides. Logan, et al. teaches that ceria has been used in three way catalysts for the promotion of the water gas shift reaction. The activity is due to the oxygen storage capacity of the ceria. Using other rare earth metals may increase this oxygen storage capacity. Mixed valence rare earths such as praseodymium are active at lower temperatures. (pg 468) When

Art Unit: 1793

praseodymia is present in an amount greater than 45.5%, the surface area decreases, and at higher amounts, the phases separate into separate ceria and praseodymia oxides, which is not desirable. The lowest oxygen desorption temperature appears to be reached (pg, 469, Results)

Logan, et al. thus teaches that in the art of water gas shift activity, that the use of praseodymium and cerium oxides are known in the art to achieve a lowered oxygen storage and release temperature.

Silver '182 teaches that the zirconia is added in order to increase the number of oxygen vacancies and to increase resistance to sintering. If the temperature needs did not require a reduced sintering ability or if the oxygen storage ability in ceria alone would be sufficient, then zirconia would not be required in the composition. The omission of an element and its function are is not found to be patentable over the prior art. Furthermore since praseodymia appears to serve the same purpose in terms of oxygen vacancies it would have been obvious to replace the zirconia content with praseodymia.

Regarding the amounts of ceria content in the support, it would have been obvious to optimize the amount of ceria in the composition to reach the desired activity level. Logan, et al. teaches that the oxygen storing and releasing temperatures are affected by the relative amounts of ceria and praseodymia.

Regarding the identity of the supported precious metal or an oxide thereof, Silver '182 recites the claimed metals of ruthenium, platinum, iridium, and silver. The metals

Art Unit: 1793

are also taught to be supported in an amount of 0.1-2.0 mol%, which would overlap with the claimed range of 0.1 to 10 wt.%. Silver '182 teaches that a combination of metals may be supported onto the catalyst, but does not specify the ratios of specific metals to one another.

Marecot '984 teaches the known practice in the art to utilize more than one catalytic species to increase the scope of catalyst activity. Marecot '984 teaches the creation of a multi-metal catalyst containing at least one metal A and at least one metal B. (claim 1) The metals are chosen from Groups VIII and IB. These groups include iron, ruthenium, iridium, platinum, and silver. (col 3, lines 22-25) Porous carriers known in the art for such catalyst compositions include oxides of cerium or zirconium. (col 1, lines 32-37) Multimetal catalysts are often employed in order to broaden the range of activity of the catalyst. Examples of improved catalytic activity are discussed in different applications. (col 1, lines 14-23) The method of Marecot '984 may be utilized for a variety of catalysts, including the conversion of exhaust fumes containing carbon monoxide or soot. (col 5, lines 23-28)

Therefore, regarding the choice of metals and the ratios, it would have been obvious to utilize two or more catalytic species in the composition of Silver '182. Upon choosing the more than one catalytic metal in view of the teaching of Marecot '984, it would have been obvious to one of ordinary skill in the art to optimize the catalyst composition according to the intended use.

Silver '182 does not teach a catalyst for treating a suspended particulate matter. However, this is an intended use of the catalyst, and thus it is not given patentable weight as long as the general composition of the catalyst is found. The broadest claim only requires a ceria containing composite oxide. In addition, since a substantially similar compound is described in the prior art, the ability to treat suspended particular matter is found to be inherent.

Therefore, due to the motivation to optimize the catalytic species component ratios and content, claims 1-17, 19 and 20 are not found patentable over the prior art.

Response to Arguments

5. Applicant's arguments filed 2/26/2009 have been fully considered but they are not persuasive.

Applicant argues that the claims now exclude the use of zirconia, and that the lack of zirconia creates unexpected results. This is illustrated through a comparison of active temperatures. However, these results are based on an intended use, and the claims do not require any sort of specific activation temperature. Also, as discussed in the new grounds of rejection above, the use of praseodymium specifically is known to enhance the activity of ceria in general. Oxygen storage ability is known in the art of combustion catalysis also, and the same properties which make ceria suitable for three way catalysts or water gas shift catalysts are applicable.

Art Unit: 1793

In regards to the declaration filed 2/26/2009, examples are pointed out on pages 2 and 3 referring an oxide which contains zirconia, which is excluded by the amended claims. In addition, the examples are drawn to a "ceria-zirconia-praseodymium" oxide while Table 8 states a " $\text{CeO}_2\text{-Pr}_6\text{O}_{11}\text{-La}_2\text{O}_3$ " oxide, providing contradicting information. Also as discussed earlier, the presence of lanthanum should also be excluded from the oxide. Examples 13-16 all contain zirconia. It is thus unclear what favorable characteristic is shown, since the examples appear to not be drawn to the claimed subject matter.

The declaration is also drawn to a very specific property of soot-initiated combustion temperature and creates comparative examples between products of Silver '182 and the instant claims which are not commensurate in scope with the claims. Both the prior art and the claims allow for more precious or noble metals than ruthenium, and combinations thereof. It is shown within Applicant's own data that the loading of the metals also affects this soot-initiated active temperature when the support remains the same. Therefore, only showing that a zirconia-containing support does not have as low of a temperature with the use of ruthenium does not provide a fair enough showing for all of the claims.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1793

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 8:00am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

DJL